

CLAIMS

1. A system for monitoring a network, comprising:

a graphical interface layer that displays a logical view of said system and handles user interactions;

a logical network layer that logically represents said network and integrates a customizable application module via a generic platform; and

a network adaptor layer that generates management messages for said network and translates messages from said network for said logical network layer, wherein said logical network layer is positioned between said network adaptor layer and said graphical interface layer.

2. The system of claim 1, wherein said network comprises one of an active network that includes programmable packets invoking service functions at network nodes, and a traditional network.

3. The system of claim 1, wherein said logical network layer comprises:

a plurality of logical representations of entities of said network; and

a logical network controller that controls said logical network layer.

4. The system of claim 3, wherein each of said logical representations comprises one of the following logical components:

a node that represent a network node;

a port that represents a network interface of said node;

a link that represents one of a physical link and a virtual link among at least two network ports; and

a logical packet that represents a data packet.

5.The system of claim 4, wherein each of said logical representations comprises:
a handle to a corresponding graphical component in said graphical interface layer;
a handle to said logical network controller;
a flag indicative of a status of one of said logical components;
at least one gauge parameter that records statistics related to a particular said one of said logical components; and
an event handler that processes an event and a message received from said logical network controller.

6.The system of claim 5, wherein said port includes a handle to said node, and said link includes a plurality of handles to corresponding ports connected by said link.

7.The system of claim 4, wherein said logical components are interconnected by event registration and dispatching performed by said logical network controller to specify interdependencies between said logical components.

8.The system of claim 4, wherein said logical packet represents data exchanged between at least two network nodes such that a trace of said logical packet is independent of at least two nodes, and said at least two nodes do not maintain transient states for said logical packet.

9.The system of claim 8, wherein all messages for said data packet are directed to said logical packet, and said logical packet performs an updating operation and displays a traversing path by controlling particular graphical components.

10.The system of claim 3, wherein said logical network controller comprises an event registering and dispatch engine for a message, said engine comprising a message table configured to map a message to a corresponding application message handler.

11.The system of claim 10, wherein said message table comprises a message name, an originator of said message and a name of an application, wherein said originator of said message can be a symbol that represents a plurality of originators.

12.The system of claim 10, further comprising an application message handler that extends and customizes said logical representations, and registers messages to be handled with said logical network controller.

13.The system of claim 12, wherein at least one of said logical components and said application message handler register said messages to be handled with said logical network controller, such that said logical network controller controls an arriving message from said network adaptor layer via said message table.

14.The system of claim 10, wherein said logical network controller further comprises:
a default message handler that handles a message that has not been registered with said logical network controller by an application message handler; and

an interface with said network adapter layer that encapsulates and transmits events from said graphical interface layer to said network adapter layer, and analyzes and dispatches messages from said network adaptor layer to said logical components.

15.The system of claim 1, wherein said graphical interface layer comprises a graphical layer controller that manages said graphical interface layer and a plurality of graphical components.

16.The system of claim 15, wherein said graphical layer controller performs initialization to initiate parsing and display of data, presents a look and a feel of graphical components, and manages user interface events.

17.The system of claim 16, wherein all of said graphical components have corresponding logical components in said logical network layer, and an appearance of corresponding ones of said graphical components are updated in accordance with a status of said logical components in said logical network layer.

18.The system of claim 1, wherein said graphical interface layer can be customized to build a graphical user interface based on an XML document.

19.The system of claim 1, wherein said network adaptor layer comprises a network adaptor coupled between said logical network layer and an active network.

20.The system of claim 19, wherein said network adaptor analyzes a packet received from said network and translates said packet into a message that can be understood by said logical network layer in a first direction, and converts a request from said logical network layer and transmits said request to a target in said network in a second direction.

21.The system of claim 19, wherein said network adaptor performs monitoring functions requested by said logical network layer by selecting a particular active program, said monitoring functions can be customized by programming active packets sent from said network adaptor, and a required format is coded directly into said active packets to be sent to said network.

22. The system of claim 1, wherein said network adaptor layer comprises a network adaptor that supports an SNMP management interface that monitors a traditional network.

23.The system of claim 1, further comprising an application message handler that creates application-specific components, wherein said application-specific components correspond to application-specific network components.

24.The system of claim 23, wherein said application-specific components are created in accordance with an XML file specified by an application.

25.The system of claim 1, wherein said management messages comprise one of an active message for an active network and a SNMP message for a traditional network.

26.The system of claim 10, wherein said message comprises a name of said message, a name of an application to which said message is associated, an originator of said message, and data based on a type of said message.

27. A method of monitoring a network, comprising:

- (a)receiving a message from the network;
- (b)handling said message through a logical network layer;
- (c)notifying a graphical interface layer of said handling of said message; and
- (d)performing a graphical operation in said graphical interface layer in accordance with said notifying step.

28.The method of claim 27, wherein said handling step comprises

- (a)comparing information from said message with data in a message table indicative of a capability of an application message handler to handle said message;
- (b)processing said message based on said comparing step, in one of said application message handler and a logical network controller; and
- (c)discarding said message if said message cannot be processed in said processing step.

29.The method of claim 27, said handling step comprising creating and registering a new logical component.

30.The method of claim 29, said creating and registering step comprising:

dispatching a message from a logical network controller to an application message handler;

said application message handler creating a new logical component; and

registering said new logical component in a list of existing logical components in said logical network controller.

31. The method of claim 29, said creating and registering step comprising:

creating a new logical component in said logical network layer, wherein said logical network controller performs said creating step; and

registering said new logical component in a list of existing logical components in said logical network controller.

32. The method of claim 27, further comprising:

translating said message from said network in a network adaptor into a format that is understood by said logical network layer; and

transmitting said understood message to a logical network controller in said logical network layer.

33. The method of claim 32, further comprising generating an output in said graphical interface layer in accordance with said understood message in said logical network controller, wherein said output is generated in accordance with instructions from said logical network controller.

34. The method of claim 27, wherein an initialization file describes components of a user interface, event models and application modules so as to perform customization of a monitoring tool of said network.

35. A method of monitoring a network, comprising:

(a)generating a request in a graphical interface layer;

(b)determining whether an operation to satisfy said request can be performed at said graphical interface layer; and

(c)performing said operation in one of (i) only said graphical interface layer, and (ii) said graphical interface layer and a plurality of underlying layers, based on a result of said determining step.

36.The method of claim 35, said performing step comprising:

(a)said graphical interface layer transmitting said request to a logical network controller;

(b)said logical network controller converting said request into a message and transmitting said message to a network adaptor;

(c)said network adaptor translating said message into a format readable by said network and transmitting said translated message to said network; and

(d)said network adaptor receiving information from said network in accordance with said request.

37.The method of claim 35, further comprising a graphical component in said graphical interface layer notifying a corresponding logical component in a logical network layer of said request and transmitting said request to said logical network controller.

38.The method of claim 35, wherein said request is generated in accordance with a user action performed at a user interface of said graphical interface layer.